

Claims

- [c1] 1. A method of detecting abnormal plasma discharge in a chamber, said method comprising:
 - providing an input signal to said chamber; and
 - monitoring impedance of said chamber,wherein an abrupt change in said impedance indicates an abnormal plasma discharge in said chamber.
- [c2] 2. The method in claim 1, wherein said input signal comprises a ramped signal.
- [c3] 3. The method in claim 1, wherein said ramped signal includes one of a step ramped signal and a smooth ramped signal.
- [c4] 4. The method in claim 1, wherein said input signal comprises a radio frequency (RF) signal.
- [c5] 5. The method in claim 1, wherein said impedance indicates the voltage of the chamber.
- [c6] 6. The method in claim 1, wherein said abrupt change in said impedance comprises an abrupt drop in peak-to-peak voltage of said chamber.

- [c7] 7. The method in claim 1, wherein said abrupt change comprises a drop of greater than 5%.
- [c8] 8. The method in claim 1, wherein said process of providing said input signal uses electrical contacts connected to said chamber and said process of monitoring said impedance measures impedance of said electrical contacts.
- [c9] 9. The method in claim 1, wherein said abnormal plasma discharge comprises plasma leakage.
- [c10] 10. The method in claim 9, wherein said plasma leakage comprises formation of a region of secondary plasma in a location different from a primary plasma formation location.
- [c11] 11. A method of detecting plasma leakage in a reactive ion etching (RIE) chamber, said method comprising:
providing an input signal to said chamber using electrical contacts;
gradually increasing the power of said input signal;
and
monitoring impedance of said electrical contacts to determine the voltage of said chamber,
wherein an abrupt drop in peak-to-peak voltage of said chamber indicates plasma leakage in said cham-

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- [c12] 12. The method in claim 11, further comprising recording the power at which said abrupt drop occurred.
- [c13] 13. The method in claim 11, wherein said process of gradually increasing the power of said input signal comprises supplying one of a step ramped signal and a smooth ramped signal.
- [c14] 14. The method in claim 11, wherein said input signal comprises a radio frequency (RF) signal.
- [c15] 15. The method in claim 11, wherein said abrupt drop comprises a drop in said peak-to-peak voltage of greater than 5%.
- [c16] 16. The method in claim 11, wherein said plasma leakage comprises formation of a region of secondary plasma in a location different from a primary plasma formation location.
- [c17] 17. The method in claim 11, further comprising correlating the power level at which said abrupt drop in peak-to-peak voltage occurred with a specific type of chamber defect.
- [c18] 18. A system for detecting plasma leakage in a reactive ion etching (RIE) chamber, said system comprising:

electrical contacts connected to said chamber and being adapted to provide an input signal to said chamber;

a variable power controller connected to said electrical contacts and being adapted to gradually increase the power of said input signal; and

an impedance monitor connected to said electrical contacts and being adapted to monitor impedance of said electrical contacts to determine the voltage of said chamber,

wherein an abrupt drop in peak-to-peak voltage of said chamber indicates plasma leakage in said chamber.

[c19] 19. The system in claim 18, further comprising a recording device adapted to record the power at which said abrupt drop occurred.

[c20] 20. The system in claim 18, further comprising a radio frequency (RF) generator connected to said variable power controller and being adapted to generate said input signal.